# SASSI: Subsystems for Automated Subsurface Sampling Instruments, Phase I

Completed Technology Project (2008 - 2008)

## Project Introduction

Future robotic planetary exploration missions will benefit greatly from the ability to capture rock and/or regolith core samples that deliver the stratigraphy of the target formation intact to the in situ analysis suite. Obtaining and delivering consolidated/unconsolidated material is a much more complex engineering problem than drilling. This process requires additional mechanisms to capture as well as eject the core to the sample processing and analysis chain. To accommodate future missions, these core handling technologies must be developed to meet a broad range of potential requirements. Previous coring tool development philosophies have focused on integration and far-horizon proof of concept, resulting in complete systems designed around limited requirements. Lessons have been learned from these efforts, but these "point designs" do not span the space of potential coring tool requirements for future missions. The way forward in coring tool development, therefore, lies in maturing specific aspects of design quickly. As a leader in the development of planetary surface/subsurface access and sample acquisition/handling systems for NASA, Honeybee Robotics Spacecraft Mechanisms Corporation is uniquely suited to perform this task. Specifically, the purpose of this SBIR effort is to mature a set of core handling designs for consolidated and/or unconsolidated material and prove their relative utility under a variety of potential mission scenarios. In Phase I, this will include studying sample handling approaches developed to date and applying the lessons learned from previous design and test programs to the development of revised and/or novel new core handling approaches. In Phase II, the approaches from Phase I will be implemented and refined through multiple design-build-test iterations until the designs reach a high TRL. These designs will collectively be able to meet the requirements of future missions, whatever they may be.


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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Jet Propulsion Laboratory (JPL)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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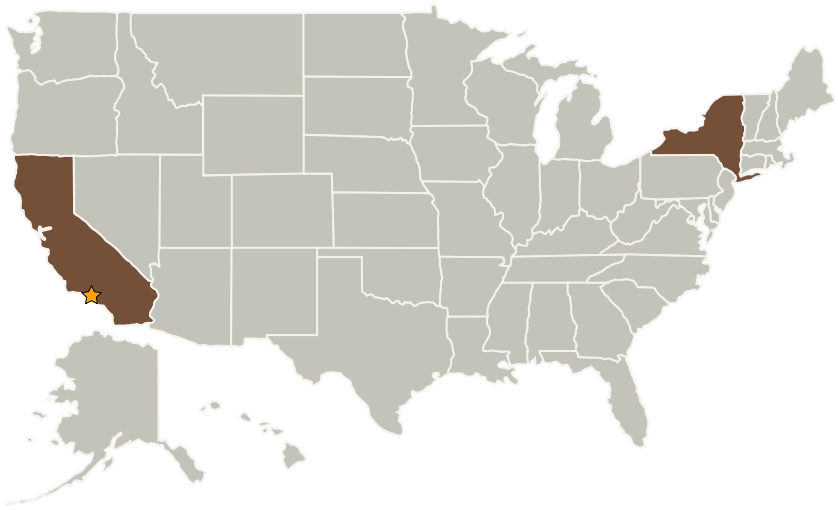
## Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ★Jet Propulsion Laboratory(JPL) | Lead Organization | NASA Center | Pasadena, California |
| Honeybee Robotics, Ltd. | Supporting Organization | Industry | Pasadena, California |

| Primary U.S. Work Locations | |
|---|---|
| California | New York |

## Project Management

**Program Director:**
Jason L Kessler

**Program Manager:**
Carlos Torrez

**Principal Investigator:**
Kiel Davis

## Technology Areas

**Primary:**

- TX04 Robotic Systems
  - TX04.3 Manipulation
    - TX04.3.4 Sample Acquisition and Handling